NON-PUBLIC?: N
ACCESSION #: 9006250332
LICENSEE EVENT REPORT (LER)

FACILITY NAME: H. B. ROBINSON STEAM ELECTRIC PLANT, PAGE: 1 OF 4
UNIT NO. 2

DOCKET NUMBER: 05000261

TITLE: REACTOR TRIP DUE TO FAILURE OF FEEDWATER REGULATING VALVE
EVENT DATE: 05/17/90 LER #: 90-007-00 REPORT DATE: 06/18/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: C. T. Baucom, Senior Specialist TELEPHONE: (803) 383-1253

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: SJ COMPONENT: FCV MANUFACTURER: C635
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On May 17, 1990, at 0606 hours, an automatic reactor trip was received from a steam flow-feedwater flow mismatch coincident with a low level in steam generator (SG) B. The cause of the event was an equipment failure in that the SG B feedwater regulating valve (FRV) malfunctioned in a manner which impeded flow to SG B. Disassembly and inspection revealed that a spring pin had sheared which allowed the valve plug to unthread from the valve stem. A possible contributing factor was a procedural deficiency in that the vendor recommended stem-to-plug torque requirement was not provided within the FRV corrective maintenance procedure. The stem and plug were torqued to the required value and a new stem and longer spring pin were installed. The FRVS for SGs A and C were also disassembled and inspected, with precautionary replacement of both spring pins, and replacement of the valve stem for the SG C FRV. A procedure revision has been made to incorporate the recommended torque value. This

event was reported via the Emergency Notification System at 0717 hours pursuant to 10CFR50.72 (b)(2)(ii). This Licensee Event Report is submitted pursuant to 10CFR50.73 (a)(2)(iv).

END OF ABSTRACT

I. Description of Event

On May 17, 1990, the unit was operating at steady-state conditions with reactor power at 100% and net electrical generation at 718 MW. 1_/ Routine operations and shift activities were in progress. During a routine tour of the unit, the shift foreman noted from local position indication that the feedwater regulating valve (FRV) for steam generator (SG) B, FCV-488, appeared to be further open than SGs A and C ERVS, FCV-478 and FCV-498, respectively. While investigating this discrepancy and preparing to notify members of Operations and Technical Support staff, several alarms were received in the Control Room indicating a problem with SG B. Plant operators noted that FCV-488 demand position indication was at 100% with decreasing level in SG B. At 0606 hours, an automatic reactor trip was received from a steam flow-feedwater flow mismatch coincident with a low level in SG B. All automatic Reactor Protection System (RPS) features responded as expected and the unit was stabilized at hot shutdown in accordance with emergency operating procedures.

Subsequent disassembly of FCV-488 revealed that the valve spring pin had sheared, which allowed the valve plug to rotate and unthread from the valve stem (Reference Figure 1). This resulted in the steam flow- feedwater flow mismatch, with RPS actuation occurring when SG B level reached the low level setpoint. Since steam generator level control instrumentation sensed the reduced feedwater flow, a signal was generated to open the FRV, which resulted in the valve demand position indication reaching 100%. However, due to the degraded connection between the valve plug and stem, movement of the valve stem by its operator had no effect on actual feedwater flow to SG B.

At 0717 hours, notification was made to the NRC via the Emergency Notification System. This notification was made pursuant to 10CFR50.72 (b)(2)(ii) as an event or condition which resulted in automatic actuation of the Reactor Protection System.

1_/ H. B. Robinson Steam Electric Plant Unit No. 2 is a Westinghouse pressurized water reactor power plant in

commercial operation since March 1971.

II. Cause of Event

The SG B feedwater regulating valve is a 12 inch cage and plug valve with special, cylinder-type, single stage trim. 2_/ Disassembly and inspection of this valve following the event revealed that the valve spring pin had sheared, which allowed the valve plug to rotate and unthread from the valve stem. 3_/ Close inspection of the spring pin indicated that one end had been sheared, while the other end showed no signs of shearing. This indicated that the spring pin may not have been fully engaged through the valve stem and both sides of the plug boss. Some pitting corrosion was observed on the shaft of the spring pin, however, this is not believed to have contributed to its shearing. Based on this inspection activity, a contributing factor to this event was a lack of full engagement of the spring pin between the valve stem and plug which resulted in one end of the spring pin being excessively loaded.

Conversations with the valve vendor indicated that the recommended valve stem to valve plug torque is 100 ft-lbs. This information was found within existing plant documentation, but had not been incorporated into Corrective Maintenance procedure, CM-107, "Main Feedwater Regulating Valve Maintenance." Disassembly and inspection of SGs A and C FRVS, FCV-478 and FCV-498, found that FCV-478 had at least 100 ft-lbs. torque between the plug and stem, while FCV-498 had slightly less than the required torque. The exact torque value between the stem and plug for FCV-488 prior to disassembly and repair is not known. However, inadequate torque on the stem-to-plug assembly may have resulted in undue stresses on the spring pin, which may have contributed to the spring pin failure.

III. Analysis of Event

Although the failure of SG B FRV resulted in an RPS actuation and plant transient, this occurrence has minimal overall safety significance. As stated within the Basis for Technical Specification 3.1.1.2, "one steam generator capable of performing its heat transfer function will provide sufficient heat removal capability to remove core decay heat after a normal reactor shutdown." With the failure of FCV-488, normal feedwater flow

remained available to two of three SGs, and feedwater flow was available to SG B through the FRV bypass valve. Also, the Auxiliary

Feedwater System was available to supply any or all of the three SGs. Therefore, the ability to remove decay heat using the secondary heat sink was never jeopardized.

2_/EIIS Codes: System-SJ; Component-FCV; Manufacturer-C635

3_/Cause Code: X

This event was reported via the Emergency Notification System as a four-hour non-emergency event pursuant to 10CFR50.72 (b)(2)(ii) and is reportable within the Licensee Event Report system pursuant to 10CFR50.73 (a)(2)(iv). Both of these reports are required due to an event or condition that resulted in automatic actuation of the Reactor Protection System.

IV. Corrective Actions

As stated above, SG B FRVP FCV-488, was disassembled, inspected, and repaired. This repair included installation of a new spring pin, however, the specified replacement part obtained from stock was found to be 3/16 inch diameter and 1 1/4 inches long. To ensure full engagement of both ends of the spring pin, an acceptable replacement pin was installed which was 3/16 inch diameter and 1 1/2 inches long. Also, due to damage found on the valve stem threads, a new valve stem was obtained and installed. The valve plug was installed and properly torqued to 100 ft-lbs.

An inspection was performed of SGs A and C FRVs to determine if similar problems might exist. Inspection of SG A FRV, FCV-478, found adequate torque between the plug and stem. Also, as a precautionary measure, the valve spring pin was replaced. Inspection of SG C FRV, FCV-498, found that the torque between the stem and plug was less than 100 ft-lbs. Based on this finding, a new stem was obtained and installed, and the stem and plug assembly was torqued to 100 ft-lbs. Again, as a precautionary measure, the valve spring pin was replaced. Both of the replacement spring pins were 3/16 inch diameter and 1 1/2 inches long.

Finally, CM-107 has been revised to incorporate the proper stem-to-plug torque value of 100 ft-lbs. This procedure revision was completed and implemented on June 15, 1990.

V. Additional Information

A. Failed Component Identification

Special, cylinder-type, single stage 12 inch cage and plug valve manufactured by Copes-Vulcan.

B. Previous Similar Events

LER 87-020 described two reactor protection system actuations which occurred due to malfunctions associated with the SG A FRV. These malfunctions were described as being separate and unrelated.

TEXT PAGE 4A OF 4

Figure 1 omitted.

ATTACHMENT 1 TO 9006250332 PAGE 1 OF 1

CP&L
Carolina Power & Light Company

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JUL 18 1990

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United States Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
LICENSEE EVENT REPORT 90-007

Gentlemen:

The enclosed Licensee Event Report (LER) is submitted in accordance with 10 CFR 50.73 and NUREG-1022 including Supplements No. 1 and 2.

Very truly yours,

R. E. Morgan

General Manager
H. B. Robinson S. E. Plant

Enclosure

cc: Mr. S. D. Ebneter
Mr. L. W. Garner
INPO

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